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drive circuit 70. Further, claim 4 has been amended to recite that the signal varies inversely with the power supply voltage. Therefore, Applicant submits that claim 4 is not vague and indefinite and further limits claim 1. Claim 21 has been amended to more clearly limit the duration of the initial peak current of the output signal of claim 19. In view of the above, Applicant submits that the rejection of claims 1-4 and 19-22 under 35 U.S.C. §112, second paragraph, should be withdrawn.

Claims 1-4, 16 and 19-23 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nojima in view of Oyama et al. The operation of Nojima is fully described in the Amendment and Response filed on July 11. Most importantly, with Nojima, the operator can select the duration of the pull-in or peak current and the duration of the hold current, so that the gun operation can be adapted to different fluid viscosities and other application variables. However, once the peak and hold current durations are selected, they remain fixed and are not affected by the magnitude of the line voltage.

Oyama et al. relates to an electromagnetic coil drive device that is capable of powering an electromagnet in response to power supply voltages in a range of from 100-200 volts. The operation of Oyama et al. is also fully described in the Amendment and Response filed on July 11. In summary, referring to Figs. 5d, 5g and 5j, the magnitude of initial closing current flowing to the coil is maintained constant in the presence of different input voltage levels by a pulse width modulation of pulses Pa as shown in Figs. 5b, 5e and 5h as a function of the power supply voltage. As shown in Fig. 1, the pulses Pa are used to operate an on-off drive circuit 13 that in turn, operates the switch 12. However, the duration over which the pulses Pa are applied to the drive circuit 13 is controlled by a fixed delay determined by R ($9_3$), C($9_5$) and regulated voltage (16) of timer circuit 9 shown in Fig. 2. As described at col. 7, lines 11-17, the timer circuit 9 times a period sufficient to complete the coil closing operation. Thus, as clearly shown in Figs. 5d, 5g and 5j, the durations of the closing currents do not vary as a function of the power supply voltage.

In paragraph 12 of the Office Action, it is stated that

> Applicant argues that the switch of Oyama et al. has a duty cycle inversely proportional to the power supply voltage and that the pulse signal does not.

Applicant respectfully disagrees. Applicant is arguing that the comparing circuit 12 produces pulse a width modulated signal Pa (Figs. 5b, 5e, 5h) that modulates the operation of the switch 12 during the application of the closing current to the coil. Thus, the magnitude of the closing current is maintained constant (Figs. 5d, 5g, 5j) regardless of the applied power supply voltage. Applicant further argues that Figs. 5d, 5g, 5j clearly illustrate that the duration of the closing current is fixed by the above described timer circuit 9 and does not change.

To further support its position, the Office Action then in Paragraph 12 refers to the following sentence in the Description of the Prior Art of Oyama et al. at col. 2,lines 12-17:

> As a result, the duty ratio of the closing pulse signal from the closing comparing circuit is reduced to a value smaller than that in the case where the power supply voltage is low, thereby overcoming the problem of different values of the power supply voltage.

That sentence relates to a description of operation of Japanese Patent Laid-open Application (Kokai) No. 62-145619. Applicant was unable to find a copy of the circuit diagram of Kokai to better understand its operation. However, the description in Oyama et al. provides some guidance. At col. 1, lines 41-50, Kokai has an oscillator providing a saw-tooth wave that is used to produce the closing pulse signal. Further, at col. 1, lines 57-59, the closing pulse signal generated by the closing comparing circuit is supplied to the on-off drive circuit for switching the switching element. Thus, the closing pulse signal described at col. 2, lines 12-18 is not a signal that is applied to a coil but instead, is a signal that is applied to an on-off driver circuit that is applied to a switching element. As described at col. 1, lines 33-36, the switching element applies the output voltage from the power supply to the coil.

In view of the above description in Oyama et al., Applicant submits that the variable duty ratio of the closing pulse signal recited in col. 2, lines 12-18 does not relate to the duty ratio of the operation of the switching element; and thus, the recited duty ratio does not control the duration of the closing current. Applicant further submits that Kokai most probably operates similarly to the circuit of Fig. 1 of Oyama et al., which illustrates a comparing circuit 12, an on-off drive circuit 13 and switching element 12. The pulse width modulation of the closing pulse signal in controlling the magnitude of the current applied to the coil is further supported by Ohtsuka at col, 2, lines 9-21 where the operation of Kokai is described with respect to the prior art Fig. 10 of Ohtsuka.

Further, Applicant submits that the description of Kokai at col. 1, lines 60-64 supports a conclusion that the duration of the closing current of Kokai is fixed and determined by a predetermined period of time counted by a delay circuit.

Therefore, for the reasons cited above and in the Amendment and Response filed July 11, 2002, Applicant continues to submit that claims 1-4, 16 and 19-23 are patentable and not obvious under 35 U.S.C. §103(a) over Nojima in view of Oyama et al.

Claims 1-4, 16 and 19-23 are rejected under 35 U.S.C. §103(a) as being unpatentable over Nojima in view of Ohtsuka. Ohtsuka relates to a method of controlling an electromagnetic contactor, wherein the contactor is capable of recognizing and operating with different power supplies, for example, 100 volt or 200 volt, AC or DC power supplies. Referring to Fig. 3 and col. 9, lines 20-30, a timer circuit 16 is used to control the duration of a closing operation, T1, (curve (e) of Fig. 6) of a higher current magnitude, after which the current is switched to a lower magnitude, maintenance operation. The operation of the timer circuit 16 is further described at col. 12, line 65 - col. 13, line 8 and elsewhere.

Applicant submits that the combination of Nojima and Ohtsuka fails to provide a prima facie obviousness rejection. In order to establish a prima facie case of obviousness, it is necessary that the Office Action present

evidence, preferably in the form of some teaching, suggestions, incentives or inference in the applied prior art or, in the form of generally available knowledge, that one having ordinary skill in the art would have been led to arrive at the claimed invention.

A prima facie case of obviousness is not made because Nojima and Ohtsuka et al. neither alone nor in combination disclose or suggest the claimed inventions. Each of the independent claims requires an output signal be applied to a coil or solenoid having an initial peak current with a variable duration followed by a hold current, wherein the duration of said initial peak current varies as a function of the power supply voltage. As described at page 10 of the application, line 11 through page 13, line 5 and elsewhere, referring to Fig. 4, the PWM 130 is operated at a set, for example, 100%, duty cycle for the duration of the peak current. A delay circuit 132 controls the duration of the peak current as an inverse function of the power supply voltage. Thus, the greater the power supply voltage, the shorter the duration of the peak current. At the end of the peak current duration, the duty cycle of the PWM 130 is reduced to provide the hold current to the solenoid.

In Nojima, the pull-in or peak current duration is selectable by the operator, but once selected, is fixed during the operation of the solenoid. In Ohtsuka, as shown in curve (f) of Fig. 6, the duration of the higher magnitude closing current is fixed and controlled by the operation of timer circuit 16 as shown by T1 of curve (e) of Fig. 6. Thus, Ohtsuka does not disclose or in any way suggest varying the duration of the closing current or operation prior to the initiation of the maintenance current or operation.

Therefore, for the reasons cited above and in the Amendment and Response filed July 11, 2002, Applicant submits that claims 1-4, 16 and 19-23 are patentable and not obvious under 35 U.S.C. §103(a) over Nojima in view of Ohtsuka.

In paragraphs 7 and 8 of the Office Action, it is asserted that claims 16 and 19 are substantially identical. Applicant respectfully disagrees. Claim 16 is directed to a method of operating a fluid dispenser whether it be an electrically

operated fluid dispenser as shown in Fig. 1 or a pneumatically operated fluid dispenser as shown in Fig. 6. With the electrically operated fluid dispenser of Fig. 1, a coil 54 is located inside the gun and has an armature 52 forming part of the valve stem 34. In contrast, as shown in Fig. 6, a coil 660 of a solenoid valve 632 is operated to port pressurized air to a piston assembly 664 in the gun, which operates a valve stem 642. In contrast, claim 19 is directed to a method for operating an electrically operated fluid dispenser. Applicant submits that in the context of the specification, the words "electrically operated" in claim 19 are significant as limiting claim 19 to the electric fluid dispenser of Fig. 1.

In paragraph 10 of the Office Action, claims 1-4, 16 and 19-21 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 4 of copending Application Serial No. 09/880,649 in view of Oyama et al. As previously discussed, Applicant submits that Oyama et al. does not disclose a driver circuit of a coil, which provides an initial peak current that has a duty ratio changing inversely proportionally to the power supply voltage. Therefore, Applicant submits claims 1-4, 16 and 19-21 are patentable over claim 4 of copending Application Serial No. 09/880,649 in view of Oyama et al. and, that the provisional rejection under the judicially created doctrine of obviousness-type double patenting should be withdrawn.

In paragraph 11 of the Office Action, claims 1-4, 16 and 19-21 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 4 of copending Application Serial No. 09/880,649 in view of Ohtsuka. As previously discussed, Applicant submits that Ohtsuka does not disclose a driver circuit of a coil, which provides an initial peak current that has a duty ratio changing inversely proportionally to the power supply voltage. Therefore, Applicant submits claims 1-4, 16 and 19-21 are patentable over claim 4 of copending Application Serial No. 09/880,649 in view of Ohtsuka and, that the provisional rejection under the judicially created doctrine of obviousness-type double patenting should be withdrawn.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with markings to Show Changes Made."

Applicant submits that the claims remaining in the application are allowable, and the Examiner is invited to call the undersigned attorney should any questions arise.

Respectfully submitted,

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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 1, 4 and 21 are amended as follows:

1. (TWICE AMENDED) A fluid dispenser for dispensing a fluid onto a substrate comprising:

a dispensing valve movable between open and closed positions for controlling a flow of the fluid from said fluid dispenser;

a solenoid, the operation of said solenoid being effective to cause said dispensing valve to move between the open and closed positions;

a power supply having an output voltage; and

a driver circuit electrically connected to said solenoid and said power supply and providing an output signal to said solenoid <u>having</u> an initial peak current with a variable duration followed by a hold current, the duration of said initial peak current varying as a function of the output voltage of said power supply.

4. (TWICE AMENDED) The fluid dispenser of claim 1 <u>wherein the driver circuit</u> further [comprising] <u>comprises</u> a peak current duration control connected to said power supply and providing a signal varying as [a] <u>an inverse</u> function of the output voltage of said power supply.

21. (TWICE AMENDED) The method of claim 19 further comprising [producing the initial peak current with a duration] varying <u>the variable duration of the initial peak current of the output signal</u> as an inverse function of the voltage of the power supply.